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## Dissolved aluminium and manganese in the polar oceans

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# Biography

Rob Middag was born on the 4<sup>th</sup> of October 1983 in Tiel, the Netherlands. After finishing his pre-university education (VWO) cum laude he went to study biology at the University of Groningen in the northern Netherlands. After the general biology education he set out to specialize in marine biology. One of the first courses was the general introduction in (chemical) oceanography, taught by professor Hein de Baar. This course inspired him to pursue a specialization in marine biology with a focus on the a biotic environment. His first master thesis project was on CO<sub>2</sub> in the Antarctic with professor de Baar and Dr Mario Hoppema from the German Alfred Wegner Institute. This project involved a 10 week research cruise to the Southern Ocean and the Weddell Sea where the natural wonders of the Antarctic made a huge impression and left the desire to come back. The project led to a publication in a scientific journal with Dr Mario Hoppema as the lead author (see publication list below).

The second master thesis project was undertaken in Western Australia and was a joint venture between the University of Western Australia and the Department of Environment. The aim was to study the causes and extent of the environmental problem of scum formation on the lower Murray River and estuary. This appeared to be related to seasonal anoxia and eutrophication due to changes in land use and agriculture. Unfortunately this was not a politically desirable result at the time and the report was designated to stay internal. Although this project involved a very pleasant stay in Australia, it was less rewarding than the visit to the Antarctic. Immediately after finishing his masters with the highest possible distinction, cum laude, he started his PhD with professor Hein de Baar at the Netherlands Institute for Sea Research (NIOZ) within the GEOTRACES and IPY programs. This project involved 3 research cruises, a relatively short one to the Atlantic Ocean, a major 10 week expedition to the Arctic Ocean and another 10 week expedition revisiting the Southern Ocean. At the time of writing, this work has resulted in three publications as lead author in scientific journals (see publication list below), but more are intended to follow.

## Bibliography

### Papers

- Hoppema, M., **Middag, R.**, de Baar, H.J.W., Fahrbach, E., van Weerlee, E.M., Thomas, H.. Whole season net community production in the Weddell Sea. *Polar Biology* 31 (1), 2007, 101-111.
- Middag, R.**, De Baar, H.J.W., Laan, P., Bakker, K.. Dissolved Aluminium and the Silicon cycle in the Arctic Ocean. *Marine Chemistry* 115 (3-4), 2009 176-195.
- Middag, R.**, Van Slooten, C., De Baar, H.J.W., Laan, P.. Dissolved Aluminium in the Southern Ocean. *Deep Sea Research II*, Accepted for publication in *Deep-Sea Research II*.
- Middag, R.**, De Baar, H.J.W., Laan, P., Cai, P.H., Van Ooijen, J.C.. Dissolved Manganese in the Atlantic sector of the Southern Ocean. Accepted for publication in *Deep-Sea Research II*.
- Klunder, M., Laan, P., **Middag, R.**, De Baar, H.J.W., Van Ooijen, J., accepted. Distributions and sources of dissolved iron over a prime meridian transect in the Southern Ocean. *U Accepted for publication in Deep Sea Research II*.
- Rutgers van der Loeff, M.M., Cai, P.H., Stimac, I., **Middag, R.**, Klunder, M.B., Van Heuven, S., this issue. <sup>234</sup>Th in surface waters: distribution of particle export flux across the Antarctic Circumpolar Current and in the Weddell Sea during the GEOTRACES expedition ZERO and DRAKE. In review.

Thuróczy, C.-E., Gerringa, L.J.A., Klunder, M.B., **Middag, R.**, Laan, P., Timmermans, K.R., De Baar, H.J.W., submitted. Speciation of Fe in the North East Atlantic Ocean. Submitted and under review with Deep-Sea Research I.

***Meetings (presenting author underlined if this is not the first author)***

**Middag, R.** Dissolved Aluminium and Manganese in the Arctic and Antarctic Oceans. Invited oral presentation at the Polar Symposium organized by the SCAR committer of KNAW and NPP of NWO, 14-05-2008, Amsterdam, the Netherlands.

**Middag, R.**, de Baar, H.J.W., Laan, P., Bakker, K., Ober, S.. IPY-GEOTRACES: Dissolved Aluminium and Manganese in the Arctic Ocean. Poster presentation at the SCAR/IASC IPY Open Science Conference 2008, 09-07-2008, St Peterburg, Russia. Abstract number: 16929.

**Middag, R.**, de Baar, H.J.W., Laan, P., Bakker, K., Ober, S.. IPY-GEOTRACES: Dissolved Aluminium in the Arctic Ocean. Last minute oral presentation due to gap in program at the SCAR/IASC IPY Open Science Conference 2008, 09-07-2008, St Peterburg, Russia. Abstract number: 16929.

**Middag, R.**, Klunder, M.B., Thuróczy, C.-E., ., Laan, P., Gerringa, L.J.A., de Baar, H.J.W.. The Titan sampling system for trace metals. Oral presentation at the GEOTRACES Intercalibration Workshop December 2008, 12-12-2008, San Francisco, USA.

De Baar, H.J.W., **Middag, R.**, van Slooten, C., Laan, P.. Aluminium in the Arctic and Antarctic Oceans. Poster presentation at the ASLO Aquatic Science Meeting 2009, 28-01-2009, Nice, France. Poster number: 188.

**Middag, R.**, de Baar, H.J.W., Klunder, M.B., Laan, P.. Dissolved Manganese in the Arctic and Antarctic Oceans. Oral presentation at the ASLO Aquatic Science Meeting 2009, 28-01-2009, Nice, France. Session number: 99.

**Middag, R.**, de Baar, H.J.W., Klunder, M.B., Laan, P.. Dissolved Aluminium and Manganese in the Polar oceans. Oral presentation at the scientific symposium of the Poolbelevenis 2009, 06-03-2009, Middelburg, the Netherlands. Presentation in session 1 Changes in the Southern and Arctic Oceans by climate and human causes.

**Middag, R.**, Klunder, M.B., de Baar, H.J.W., Laan, P.. Dissolved Manganese in the Arctic and Antarctic Oceans. Oral presentation at the 2010 Ocean Sciences Meeting, 22-02-2010, Portland, USA. Abstract number: 709005

De Baar, H.J.W., **Middag, R.**, Laan, P.. Dissolved Aluminium in the Arctic and Antarctic Oceans, biological cycling with Silicate. Poster presentation at the 2010 Ocean Sciences Meeting, 22-02-2010, Portland, USA. Abstract number: 743130

Abouchami, W., Galer, S.J.G., **Middag, R.**, De Baar, H.J.W., Andreae, M.O., Feldmann, H., Laan, P., Raczek, I.. Cd Isotopes, a proxy for water mass and nutrient uptake in the Southern Ocean. Oral presentation at the 2010 Ocean Sciences Meeting, 22-02-2010, Portland, USA. Abstract number: 746272.

Xue, Z., Rehkamper, M., van de Flierdt, T., **Middag, R.**, de Baar, H.J.W.. Cadmium Isotope Fractionation in the Southern Ocean, Poster presentation at the 2010 Ocean Sciences Meeting, 22-02-2010, Portland, USA. Abstract number: 747873.